MYANMAR DENTAL JOURNAL

VOL. 8, NO.1

FEBRUARY, 2009

THE JOURNAL OF THE MYANMAR DENTAL ASSOCIATION

EDITORIAL

Green light or red light in dental practice

Today, dental surgeons are confronting more and more patients seeking dental treatment while they are taking antiplatelet therapies. Antiplatelet agents are prescribed for prevention of platelet aggregation in arterial thrombosis especially in myocardial infarction and ischemic stroke. Actually platelet aggregation is the normal mechanism which is essential for hemostasis and it is a vital process to arrest bleeding when the vascular injury is occurred. A congenital or acquired anomaly of platelets is the one of the major factor predisposes a patient to hemorrhagic accidents. In the dental curriculum thrombocytopenia is an important pathology emphasized as "must know topic" and all the dental students pay attention in causes and clinical manifestations of low platelet counts. Only the little information of the platelet dysfunction is mentioned in the dental syllabus.

Abnormal platelet aggregation plays an important role in the pathogenesis of thromboembolic diseases such as myocardial infarction, cerebral ischemia and peripheral arterial insufficiency. Antiplatelet drugs are now widely used for cardiovascular conditions such as rupturing atherosclerotic plaque, platelet thrombus formation due to increase activation of clotting mechanism, and blockade of vessels by distal embolization.
On the other hand, drugs can cause increasing the bleeding time and potential risk of postoperative bleeding. In practice, a favorable balance between the beneficial and harmful effects of therapy is achieved by treating patients whose thrombotic risk clearly outweighs their risk of bleeding complications (Patrono et al. 2004)

In dental practice dilemma of preoperative cessation of therapy with or without a proposal of an alternative treatment or continuation of therapy without any modification becomes the difficult problem in making the clinical decision in management. Before the period of millennium the interruption of antiplatelet therapy 10 days before surgery was recommended, but nowadays only 3 days cessation of agents is advised.

Platelet disorder is mainly assessed on quantity of platelets by doing platelet counts. The platelet count is the main laboratory test used in the evaluation of hemostasis (normal range 150–400 × 10^9/L). Minor elective procedures are generally contraindicated if the platelet count is less than 50 × 10^9/L. Spontaneous bleeding may occur in patients whose platelet count is less than 10–20 × 10^9/L.

Many drugs, natural products and foods cause various platelet dysfunctions, which can in turn affect primary hemostasis. NSAIDs, anticoagulants, antibiotics, antihistamines, antiplatelets, beta-blockers, calcium channel blockers, diuretics, tricyclics, phenothiazines, ginseng products and food

and beverages containing garlic, onion, ginger, and alcohol are the common factors causing thrombocytopenia, thrombocytopathy and thrombasthenia. A platelet count is not the reliable test for drug induced abnormal platelet function. Bleeding time test is mostly used for hemostatic disorders and not very much useful in detection of blood dyscrasia. The bleeding time is not sensitive or specific, and it does not necessarily reflect the risk or severity of surgical bleeding. It is poorly reproducible, can be affected by aspirin ingestion and by the skill of the person performing the test, and frequently leaves small thin scars on the forearm.

Recent clinical data show that the risk of coronary thrombosis after drugs withdrawal is much higher than that of surgical bleeding if they are continued. In secondary prevention, aspirin is a lifelong therapy and should never be stopped. Clopidogrel is regarded as mandatory until the coronary stents are fully endothelialized, which takes 3 months for bare metal stents, but up to 1 year for drug-eluting stents.. Inhibitors of glycoprotein IIb/IIIa receptors are likely to be the first "anti-integrins" to be used widely as potent antiplatelet agents dental surgeon must aware of the use of these drugs. Thus, interruption of antiplatelet therapy should need to be revised and the national guideline is required for the health care providers.

Detection of platelet function is not yet developed, fully equipped medical laboratories are necessary to perform the platelet aggregation test and platelet function analysis (PFA-100) which all is widely used to quantify platelet activation and aggregation capacity in many countries.

Many authorities recommend that simple extraction of not more than two teeth at the time and non-surgical dental procedures including scaling can be safely performed without interruption of antiplatelet therapy. Although it is safe clinician must aware that there is risk of critical bleeding and complication can be occurred even in nonsurgical procedure especially if the patient is taking combination or dual antiplatelet therapy. Patients taking dual therapy should be referred to have the surgical intervention in hospital based set-up to minimize the possible risks.

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Special Articles

Existing Dental Education and Future Possibilities in Myanmar

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Existing Dental Education

There are two Universities of Dental Medicine (UDM) in Myanmar, Yangon and Mandalay with annual intake of 150 students per university. Former 6 years BDS course was reduced to 5 years with 6 months house surgeon internship in 2002. Bachelor of Dental Surgery (BDS) degree is given in both universities. Master of Dental Science (MDSc) and Doctor of Dental Science (DrDentSc) courses were already opened in UDM (Yangon). Diploma of Dental Science (DipDSc) for general practitioners is also opened in UDM (Yangon). Curriculum of under-graduate course was based upon current country need and it is still unchanged from over 3 decades ago. Among postgraduate courses, MDSc syllabus was based on general dental discipline and DrDentSc syllabus based on specialties in some aspects; Oral Surgery, Oral Medicine and Prosthetics.

Paradigm Shift of Oral Health Status in Myanmar

In Myanmar, 12 year-old DMF-T around 1980 was 0.8, (very low category according to WHO) (WHO, 1997). Dental caries occurrence is increased up to DMF-T 1.2 (low category) in early 21st century, which shows oral health status among Myanmar children is in increasing trend. The population distribution pattern (population pyramid) is still unchanged and the majority proportion of young age occupied among the whole population. Therefore, the disease occurrence of young population may reflect the whole country figure.

Disease distribution pattern, especially dental caries may also change. Although there was no significant difference in caries pattern between some portion of urban & rural area, dietary pattern, especially sugar consumption is getting

higher, life-style changes may increase the occurrence of dental caries among population.

Inadequate improvement of positive oral hygiene care behavior still exists among Myanmar people. Some oral health problem of lacking oral hygiene care like periodontal disease and negative oral habits such as betel quid chewing is still common in low socio-economic groups. Distribution of some oral diseases preventive devices like fluoridated toothpaste and tooth brushes cannot be covered to the whole population.

International Dental Education (In Brief)

Nowadays, dental education system follows "Promotive Strategy" including systematic health education, monitoring, prophylaxis, sealants application in community level. Modern dentistry practices both moderate technology (simple restoration, prosthesis, extractions...etc) and advanced technology (Orthodontics, Esthetic Dentistry, Implants, Complex surgery...etc).

Highly Industrialized Countries observe the declination of dental caries and periodontal diseases, so moderate technology requirement is decreased. At the same time, demand of advanced technology probably increasing, but number of specialist operators requirement is not as high as the routine dental surgeons.

According to demographic pattern, elderly care is indicated to be higher than before because of expanding number of older population. To maintain the oral health status in community, oral health promotive measures are needed to be implemented.

Newly Industrialized Countries, 12 year old DMF-T start to decrease from moderate to low. Proportion of middle age group become higher and all kinds of strategies, i.e. promotive, moderate & advanced methods are equally important in those countries.

Developing Countries might have either no change in the initially low to very low (or) only minor changes of caries prevalence among population. Oral health promotive strategies are simultaneously important to train with moderate level of treatment technologies. Advanced level of technology is necessary as an introductory phase in undergraduate course and broader in postgraduate course.

Future Possibilities of Dental Education in Myanmar

Multiple system of dental curriculum was taught in Myanmar by using reference of both international dental education and local oral health need. Although moderate technologies are still necessary, oral health promotive strategies would be initiated broadly in the undergraduate course and advanced technologies are studied more, especially in the postgraduate level.

Some modified dental education would be introduced, such as problem orientated system, in undergraduate curriculum. Scientific approach, especially research methodology (descriptive study) is initiated in undergraduate course, parallel with clinical training. Analytical and experimental research designs are common in the postgraduate course. To cope with international level, the traditional pattern of teaching system would be changed in some profiles, like from lecture (one way) to participation (two way), journal reading, symposiums, would be implemented not only in postgraduate but also in the undergraduate courses.

Advancement of information technology like internet assessment would be used widely for searching the up to date data and technologies. The conventional method of assessment system would be changed in some portions, such as formative system is used more in the practical performance (clinical, laboratory, field trips etc.) and viva voce system is limited into the necessary students.

To have the adequate practical experience to the accepted students, the support of appropriate facilities might be originated not only from the government sector, but also from the NGOs, private non-profit firm.

Future possibilities of academic affiliation would be from the faculties of ASEAN, GMS and some allied country like Japan. International research activities would be more extended by collaboration with some related association like IADR.

For the fulfillment of the need of the community oral health care, some appropriate auxiliary courses would be opened under the structure of the Universities of Dental Medicine.

Role of Myanmar Dental Association in Oral Health Promotion

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Introduction

Myanmar Dental Association (MDA) was established in 1979. There are 15 branches of the association in States and Divisions. Most of the dental surgeons are members of the association. In Myanmar Dental College was founded as attached with Institute of Medicine (I), Yangon with the technical cooperation of Colombo Plan in 1964. And then it was upgraded as an Institute in 1974. Nowadays there are two Universities of dental Medicine; Yangon and Mandalay with yearly uptake of 150 students each.

Distribution of Dental Surgeons

Recent dental surgeons and population ratio was 1:32000 (2006). In Myanmar, Dental Surgeons are serving in public sectors which include Ministry of Health (Department of Health and Department of Medical Science) and Other Ministries such as Myanmar Railways and Ministry of Internal Affairs. Many dentists are practicing in private sector as well as cooperative sector. Table (1) shows the number of dental surgeon who work in different sectors of oral health services in Myanmar.

Table 1. Number of dental surgeons working in the different sectors of oral health services in Myanmar.

	1988	2006
Dental Surgeon	857	1732
Public	328	707
Co-operative and Private	529	1025

Source: Health in Myanmar 2007

Objectives of MDA

1. To participate in the Public Dental Health activities as directed by the State or any of the State Organizations or the Ministry of Health.
2. To work for advancement of dental medicine and to create an interest in such medicine amongst the dental surgeons.
3. To promote public dental health activities and its preventive role.
4. To solve by cooperation amongst its members the social problems and to foster family spirit amongst them.
5. To maintain the honour, dignity and professional conduct of the dental profession.
6. To organize ways and means to fraternize with members of the dental profession of other nations or similar institutions.
7. To safeguard the rightful interests of the members of the dental profession.

Activities with International Organizations

MDA had cooperated and collaborated with International Associations and Organizations such as; Federation Dentire Internationle (FDI), Asia Pacific Dental Federation (APDF), International Association for Dental Research (IADR), South East Asia Association of Dental Education (SEAADE), International College of Continuous Dental Education (ICCDE) and International College of Dentists (ICD). MDA has also worked in collaboration with Japanese Association for International Co-operation of Oral Health (JAICOH) for National Oral Health Survey. A Pilot Survey has been done in Kyauktan Township, Yangon Division by MDA in 2005 with the help of Ministry of Health and JAICOH. Financial support as well as required materials, equipment and expertise has been provided mainly by JAICOH. Oral Health Educational Manual was also published.

Oral Health Surveys

There is a general agreement in dental profession that the two most prevalent oral diseases, dental caries and periodontal diseases are largely preventable through a combination of professional and self-care activities, and that people's attitudes and behaviour play an important role in the development and prevention of oral diseases (Cohen and Gift, 1995).

The improvements in oral health conditions were observed among many Western countries, whereas deterioration in oral health has been taking place in many developing countries (WHO, 1989).

For assessment of the global generalizability of such statements for our country, appropriate data from representative population studies are needed that can be use for the planning of preventive and curative oral care programs and developing training programs for dental personnel.

Most of the countries in the world have national oral health data resulting from their national oral health surveys. Myanmar also needs national oral health data although only a few prevalent and KAP studies, mostly from University of Dental Medicine and Department of Health were available. We need internationally comparative data of Dental and Oral Diseases in WHO index age groups.

MDA is only one association in dental profession in Myanmar. Each member lives in everywhere in our country. Most of the dental surgeons are members of MDA and the 14th MDA Executive Committee planned to conduct the national oral health surveys in our country. Firstly, Steering and working committees were formed including various specialties and experts in dental public health. A project on Regional Pathfinder Oral Health Survey submitted to Ministry of Health and Workshop on Regional Pathfinder Oral Health Survey was held at UDM, Yangon.

Regional Pathfinder Oral Health Surveys

MDA has successfully started the first Regional Pathfinder Oral Health Survey in October, 2006 implementing with Mandalay, Mawlamyine, Pathein and Taunggyi branches. The second Regional Pathfinder Oral Health Survey (2007) was conducted in Yangon, Monywa, Pyi and Hpa-An Branches. MDA has intended to continue and extend the plan to other parts of the country with the approval of Ministry of Health. It is the duty of MDA members to actively take part in Oral Health Surveys. In near future, MDA will have updated and relevant data regarding the Oral Health Status of the Myanmar population. MDA has a plan to conduct the first National Oral Health Survey in 2010.

Preliminary Data of Regional Pathfinder Oral Health Survey (2006)

(Taunggyi, Mandalay, Pathein and Mawlamyine Regions)

Table 2. Sample Population by age and gender (n = 2355)

Age / Region	5 year		12 year		35 - 44 year		Total	
	M	F	M	F	M	F	M	F
Taunggyi	84	99	96	103	81	116	261	318
Mandalay	100	100	98	101	97	97	205	298
Pathein	97	102	96	100	102	96	295	298
Mawlamyine	100	97	99	100	99	95	208	292
Total	381	398	389	404	379	404	1149	1206

Table 3. Dental Caries occurrence among 12 year olds and Prevalence of Periodontal Disease among 35 - 44 year old group

	Caries Prevalence (12 year olds)	Mean DMF-T (12 year olds)	Prevalence of Periodontal Disease (35-44 year olds)
Taunggyi	53.3%	1.52	77.1%
Mandalay	49.8%	1.39	98.5%
Pathein	52.6%	1.26	78.6%
Mawlamyine	52.3%	1.36	85.1%

ACKNOWLEDGEMENTS

- **Ministry of Health**
- **Department of Medical Science**
- **University of Dental Medicine, Yangon**
- **Regional and Local Authorities**
- **MDA Branches**
- **Asia Oral Health Promotion Fund (Japan)**
- **Fresh Up Tooth Paste**
- **Smile Up Tooth Paste**
- **Mega (PMD) Co.Ltd.**

Research and Clinical Practice

Identification of Periodontopathic Bacteria in Gingival Tissue of Periodontitis Patients

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Abstract

Introduction: Identification of invading periodontopathic bacteria in tissues is important to determine their role in pathogenesis of the periodontal disease. The objective of this study was to identify periodontopathic bacteria in diseased gingival tissue of periodontitis patients.

Methods: Subgingival plaque and gingival tissue were collected from 32 generalized chronic periodontitis (CP), 16 generalized aggressive periodontitis (GAgP) and 8 localized aggressive periodontitis (LAgP) patients. Detection frequencies and quantities of *Porphyromonas gingivalis*, *Actinobacillus actinomycetemcomitans* and *Tannerella forsythensis* were investigated by polymerase chain reaction. The prevalences of *Streptococcus oralis* and *Streptococcus sobrinus* were additionally examined.

Results: *P. gingivalis and T. forsythensis* were detected in approximately 70% of tissue samples and 50% of plaque samples in three periodontitis groups. Prevalence of *A. actinomycetemcomitans* in tissue samples was higher in LAgP (63%) than that of CP (16%) and GAgP (38%). Detection frequencies of *S.oralis* and *S. sobrinus* were markedly low in both plaque and tissue samples of three periodontitis groups. Amounts of *P. gingivalis*, *A. actinomycetemcomitans and T. forsythensis* in tissue samples were not different among the three periodontitis groups.

Conclusion: *P. gingivalis*, *A. actinomycetemcomitans and T. forsythensis* can reside in diseased gingival tissue and may be involved in periodontal tissue destruction.

Introduction

Over 500 bacterial species are capable of colonizing in the oral cavity (13). Among these, *Porphyromonas gingivalis, Actinobacillus actinomycetemcomitans and Tannerella forsythensis* (formerly *Bacteroides forsythus*) are described as the major pathogens associated with periodontal breakdown (18). Subgingival biofilms containing these bacteria cause an inflammation in the tooth-supporting tissue and lead to a progressive loss of periodontal ligament and alveolar bone (3).

Histological study showed that *P. gingivalis* and *A. actinomycetemcomitans* were observed in gingival tissues of periodontitis patients (12), and higher numbers of these bacteria were found in active destructive periodontal lesions than in nonactive sites. In a recent study using fluorescent *in situ* hybridization (FISH) technique with confocal microscopy, intercellular *P. gingivalis*, *A. actinomycetemcomitans* and *T. forsythensis* were observed in human buccal epithelial cells (14). The invasion of *P. gingivalis, A. actinomycetemcomitans*, and *T. forsythensis* into gingival tissue consolidates the infection and also affect the periodontal conditions. The load of tissue-invaded bacteria seems to reflect in the tissue destructive form of periodontitis. However, it is still obscure as to the specific relationship of these three periodontopathic bacteria and tissue destruction in the various clinical forms of periodontitis.

Periodontopathic bacterial DNAs including *P. gingivalis, A. actinomycetemcomitans* and *T. forsythensis* have been detected in atheromatous plaques (5), and recently, these bacteria have become a focus as a risk factor for vascular diseases (8) and stroke (4). The bacteria invaded in the highly vascularized gingiva can spread through the bloodstream (9), and this phenomenon may relate to these systemic diseases. The identification of the invading bacteria in periodontal tissues is needed to determine their role as the risk factor of systemic diseases, as well as the pathogenesis of periodontitis and to evaluate how their presence affect diagnostic and therapeutic procedures.

The objective of this study was to identify the periodontopathic bacteria in diseased gingival tissue of different periodontitis groups.

Material and methods

Subjects

Periodontitis patients visiting the Tokyo Medical and Dental University were selected for this study. The subjects included 32 with generalized chronic periodontitis (CP), 16 with generalized aggressive periodontitis (GAgP) and 8 with localized aggressive periodontitis (LAgP), all of whom were diagnosed based on classification described by American Academy of Periodontology, 1999 (1). Each patient had no relevant systemic diseases and had not taken any antibiotics within the previous three months. All patients had received initial periodontal treatment consisting of scaling and root planing (SRP) and then been given oral hygiene instruction by competent periodontists.

Sampling procedures for subgingival plaque and gingival tissues

Three weeks after scaling and root planing, clinical parameters including probing pocket depth (PPD), clinical attachment level (CAL) and bleeding on probing (BOP) were measured and the site with the deepest PPD was chosen as the sampling site. A subgingival plaque sample was taken with a sterile paper point. The paper point was placed into a 1.5 ml microtube containing 500 µl of sterile distilled water. After gingival flap was made, diseased gingival tissue was taken by sterilized curette at the bone defect site corresponding to the subgingival plaque sampling site. A total of 40-55 mg (mean 50 mg) of gingival tissue was collected from each patient.

Bacterial detection and quantification in clinical samples

The paper point sample was mixed for 1 min by vortex, and plaque suspension was prepared. A collected tissue sample was separately washed twice with physiological saline. 500 µl of the latter wash solution was taken for examination of contamination during tissue sampling. Washed tissue sample was minced into small fragments and homogenized manually using a mortar and pestle. Then, the sample was transferred into 500 µl of new sterilized saline. Bacterial DNA was extracted using High pure DNA extraction kit (Roche Applied Science, Mannheim, Germany) according to the manufacturer's instructions and stored in -20°C until the PCR procedure was performed.

The presence of bacterial DNA for *P. gingivalis*, *A. actinomycetemcomitans* and *T. forsythensis* in plaque, tissues samples and wash solution from each patient was examined by conventional PCR. The presence of *Streptococcus oralis* and *Streptococcus sobrinus* in periodontitis was also additionally examined. Quantity of *P. gingivalis*, *A. actinomycetemcomitans* and *T. forsythensis* in tissue samples were investigated by real-time PCR. PCR reactions were performed as previously reported by Sakamoto et al. (15). Bacterial cell numbers per ml were calculated, and the minimum detection level of real-time PCR assay was 10^3cells/ml in sample suspension.

Statistical analysis

All data were handled in the StatView software package. Comparison of the prevalence of bacteria between plaque samples and tissue samples were also examined. All statistical tests were two-tailed, and a P-value of less than 0.05 was considered as statistically significant.

Results

Clinical data of the sampling sites are summerized in Table 1. No statistically significant difference was observed in the mean values of PPD, CAL and the percentage of BOP positive sites among the three periodontitis groups.

The detection frequencies of bacteria in plaque and tissue samples are summarized in Table 2. High detection rates of *P. gingivalis* and *T. forsythensis* were observed in gingival tissue of the three periodontitis groups. The prevalence of *P. gingivalis* and *T. forsythensis* were not significantly different among CP, GAgP and LAgP in both plaque and tissue samples. The detection

frequency of *A. actinomycetemcomitans* in tissue sample was higher in LAgP than that of GAgP and CP although a statistical difference was only found between LAgP and CP ($P<0.05$). Detection frequencies of *P. gingivalis* and *T. forsythensis* in tissue samples were higher than those in plaque samples, although there was no significant difference. Similar tendency was also observed in the prevalence of *A. actinomycetemcomitans* in LAgP patients. Figure 1 displays the amounts of *P. gingivalis*, *A. actinomycetemcomitans* and *T. forsythensis* in bacterium-positive tissue samples. The amount of *P. gingivalis* was higher than that of *A. actinomycetemcomitans* and *T. forsythensis* in tissue samples of all periodontitis groups. The amounts of each bacterium were not markedly different among the CP, GAgP and LAgP in this experiment.

Discussion

Approximately 70% of tissue samples were positive for *P. gingivalis* and *T. forsythensis* in GAgP and LAgP, as showing their prevalence was as high as that in CP. Our findings indicate that these two bacteria can be harbored in diseased gingival tissues and may be associated with periodontal tissue destruction. These two species are obligate anaerobic bacteria, and their characteristics might be favorable them to reside in the tissues that has low-oxygen environment. Several studies have also described that *P. gingivalis* and *T. forsythensis* were frequently detected in the subgingival plaque of aggressive periodontitis patients (7). Taken these reports together, the role of *P. gingivalis* and *T. forsythensis* are evident in the tissue destruction of aggressive periodontitis.

A. actinomycetemcomitans has been known as one of the most responsible pathogens of LAgP (2). The present findings showed that over half of LAgP patients harbored *A. actinomycetemcomitans* in tissue samples, and its prevalence was relatively higher than that in subgingival plaques. It is considered that the invading ability would allow *A. actinomycetemcomitans* to evade the mechanical debridement. Localization of *A. actinomycetemcomitans* in periodontal tissue of LAgP may cause severe tissue destruction. Although the exact mechanism has not been explained yet, this apparent major defect in neutrophils seemed more susceptible to *A. actinomycetemcomitans* than other bacteria (6).

The detection frequencies of periodontopathic bacteria in tissue samples were generally higher than those in plaque samples. Most conceivable reason of this phenomenon is due to collecting subgingival plaque and tissues samples after initial periodontal treatment. Certain amount of periodontopathic bacteria would be eliminated in periodontal pockets by initial treatment, whereas some bacteria that had already resided in tissues could still remain.

For further understanding the means of the bacterial presence in periodontal tissue, we also examined the presence of *S. oralis* and *S. sobrinus* in the same samples. *S. oralis* is known as the predominant colonizer in the early stage of dental plaque biofilm formation (10), while *S. sobrinus* is directly involved in formation of human dental caries (11). These two bacteria seem less

pathogenic for periodontitis, and our result also showed their prevalences were markedly low in both plaque and tissue samples of periodontitis patients. We assumed that the considerable amount of *S. oralis* could be eliminated from periodontal pockets by initial treatments, and its prevalence in subgingival plaque would decrease in present study.

Socransky et al. (16) reported that sufficient numbers of pathogenic bacteria must be required for onset of the disease. In our results, certain amounts of *P. gingivalis*, *A. actinomycetemcomitans* and *T. forsythensis* were observed in the tissue samples, while the amounts of each bacterium did not differ among CP, GAgP and LAgP. In the present study, tissue samples were collected from the corresponding sites of deep periodontal pockets which still remained after initial periodontal treatment. The clinical periodontal conditions were similarly severe in the sampling sites of the patients from different periodontitis groups. This may be the reason that difference in the amount of bacteria was not observed among the three periodontitis groups.

On the other hand, the amount of *P. gingivalis* in tissue samples appeared higher compared with that of *A. actinomycetemcomitans* and *T. forsythensis* in all three groups. Some previous reports showed that quantity of *P. gingivalis* was higher than that of *A. actinomycetemcomitans* and *T. forsythensis* in subgingival plaque from periodontitis patients (17). The abundant amount of *P. gingivalis* in subgingival plaque favored the frequent opportunity of the bacterial invasion and resulted to increase the numbers of this bacterium in gingival tissue.

The implication of *A. actinomycetemcomitans* in LAgP was confirmed, as shown by the prevalence of this bacterium in tissue samples was found to differ significantly between CP and LAgP. However, the level of *A. actinomycetemcomitans* in the tissue samples was not statistically different among the three periodontitis groups. We assumed that various clinical forms of periodontitis might be associated with the different pathogenic potential of *A. actinomycetemcomitans* strains and focused its serotypes. In conclusion, the localization of *P. gingivalis*, *A. actinomycetemcomitans* and *T. forsythensis* was observed in diseased gingival tissues of various clinical forms of periodontitis. In Japanese periodontitis patients, the role of *P. gingivalis* and *T forsythensis* in LAgP and GAgP is as important as in CP for periodontal tissue destruction.

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Fig. 1. Quantitative analysis in tissue samples was made by real-time PCR. Statistical comparison (Log transformed number of cell counts) was performed for each bacterium among CP, GAgP and LAgP patients. The box represents the first and third quartiles (rectangular boxes); the line within the box is the median. median.

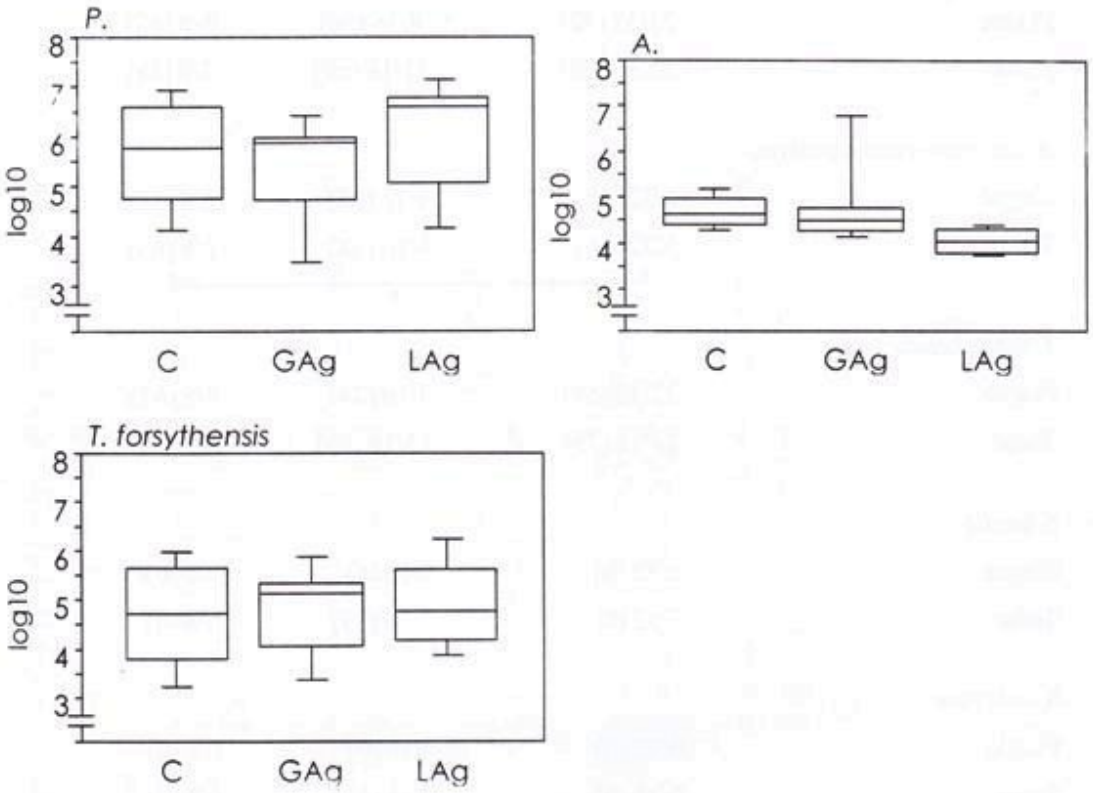

Table 1. **Clinical data**

	CP	GAgP	LAgP
Number of subjects	32	16	8
Gender (Male : Female)	12:20	9:7	4:4
Age (mean ± 1SD)	55.13 ± 7.46	35.07 ± 8.23	31.29 ± 5.56
Sampling sites			
PPD (mean ± 1SD ; mm)	5.74 ± 1.34	6.10 ± 1.46	6.37 ± 2.04
CAL (mean ± 1SD ; mm)	6.26 ± 1.73	6.39 ± 2.06	6.74 ± 2.27
BOP(% of positive sites)	67	69	86

Table 2. **Prevalence of bacteria in plaque and tissue samples**

	CP	GAgP	LAgP
P. gingivalis			
Plaque	23/32 (72)	8/16 (50)	5/8 (63)
Tissue	25/32 (78)	11/16 (69)	7/8 (88)
A. actinomycetemcomitans			
Plaque	6/32 (19)	4/16 (25)	3/8 (38)
Tissue	5/32 (16)	6/16 (38)	5/8 (63)
		*	
T. forsythensis			
Plaque	22/32 (69)	7/16 (44)	5/8 (63)
Tissue	24/32 (75)	13/16 (81)	6/8 (75)
S. oralis			
Plaque	2/32 (6)	1/16 (6)	0/8 (0)
Tissue	3/32 (9)	2/16 (13)	0/8 (0)
S. sobrinus			
Plaque	0/32 (0)	0/16 (0)	0/8 (0)
Tissue	0/32 (0)	0/16 (13)	0/8 (0)

Bacterium-positive sample / Total samples (%)

* $P < 0.05$

A Study on Masticatory Function in Posterior Bounded Saddle Cases after Rehabilitation with Metal Insert Partial Dentures

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Abstract

This study aimed to evaluate masticatory function in posterior bounded saddle cases after rehabilitation with metal insert partial dentures. The masticatory function of twelve subjects was measure by modified method of Julius Michman and Anselm langer (1975). Fresh raw carrots, cut in cubes of 6 sq mm; were used as the test food. After one week of post insertion, in one-third of patients, food comminution scores were different between normal dentate side and metal insert Removable Partial Denture side. Two-third of patient were not different in food comminution scores between their normal dentate side and metal inset Removable Partial Denture side. According to the questionnaire concerning patient satisfaction, eight patients were satisfied.

Introduction

Worldwide acceptance of the objectives of Prosthodontics enlightens the practitioners in such a way (1) that the prosthesis maintains and restores oral and general health; (2) that it does not cause lesions or an accelerated physiologic change; (3) that the patient is satisfied with the prothesis and the service is provided in the simplest and most economical way. (John F.Bate, 1978).

Chewing is the first step in the process of digestion and is meant to prepare food for swallowing and further processing in the digestive system.

Teeth form the occlusal area where the food particles are fragmented. This fragmentation depends on the total occlusal area and thus on the number of teeth.

In 1952 **De Van** stated that "our objectives should be the perpetual preservation of what remains rather than the meticulous restoration of what is missing."

Mc Cracken also said, "At the risk of over simplification, I believe a rule may be stated to the effect that the replacement of missing teeth by means of fixed restoration always should be

the method of preference, and the decision to use a removable restoration instead should be based on logical reasons for doing so. Unless a fixed bridge restoration is contraindicated for some reason, one cannot justify the use of a removable restoration for arbitrary reason alone." A removable partial denture, however, is recommended by others on the basis of certain advantages.

Ante (1926) suggested that it was unwise to provide a fixed partial denture when the root surface area of the abutment was less than the root surface area of the teeth being replaced.

Adults under 60 years may have lost one or more teeth and they need removable partial denture more frequently than complete denture (Fenn, Liddelow and Gimson, 1989).

A partial denture is a restoration, removable by the patient, for the replacement of one or more natural teeth in the mandible or maxilla in which one or more natural teeth remain (Mc Cracken, 1956).

Edward Kennedy in 1925, classified partical dentures based on the relationship of the saddle to the natural teeth. His classification into four main groups with subdivisions is still used today.

1. Kennedy Class I
2. Kennedy Class II
3. Kennedy Class III
4. Kennedy Class IV

A very broad simple division of partial dentures can be based on the tissues which first receive the vertical load of mastication or occlusion contact, namely (1) Tooth borne, (2) Mucosa borne, (3) Tooth and mucosa borne.

Nowadays, we have to add (4) overdenture supported by implant.

Tooth-borne denture can sustain a greater clenching load than either mucosa-borne or tooth and mucosa-borne dentures (DJ Neill / J.D. Watter, 1983). A tooth-borne denture can carry nearly equal clenching loads to those normally imposed on the natural teeth (Fenn, Laddelow and Gimson, 1989).

Removable partial denture with metal insert which composes rest and clasp will provide the simplest and most economical way of dental prosthesis.

The skeletal dentures are expensive and need special skill. The metal insert partial denture is cheaper and patients can afford to use it.

In this study, NPG metal alloy which is used for crown and bridge will be used for metal insert instead of cobalt-chromium alloy which is used for skeletal partial denture.

Subjective masticatory function tests have been described by many clinical studies concerning chewing ability. In this study, modified method of Julius Michman and Anselm Langer (1975) would be used for food comminution and patient satisfaction.

	NPG alloy	Cobaltchromium alloy
Yield Strength, psi (MPa)	38,425 (265)	UTS MN/m² 690
Elongation, %	15	4
Vickers Hardness, HV1	140	370 BHN
Density, g/cm³	7.8	8
Color	Yellow-gold	Platinum color
Melting Range, (°C)	1,012-1,068	1250-1450
Primary Composition	80.7% Cu, 7.8% Al, 3.0% Fe, 2.7% Zn, 1.7% Mn, 4.3% Ni (Max.)	Cobalt 35-65%, Chromium 20-35%, Nickel 30%, Molybdenum 7%, Carbon 0.4%, Mn, Fe

	NPG alloy	Ni-Cr Dental casting alloy (CB 80)
Yield Strength, psi (MPa)	38,42511 (265)	Ts 490 Mpa
Elongation, %	15	4%
Vickers Hardness HV1	140	215 Hv
Density, g/cm3	7.8	
Color	Yellow-gold	Platinum color
Melting Range, (°C)	1,012-1,068	1,150
Primary Composition	80.7% Cu, 7.8% Al, 3.0% Fe, 2.7% Zn, 1.7% Mn, 4.3% Ni (Max.)	Ni, Cr

OBJECTIVES

GENERAL OBJECTIVE

- To evaluate the masticatory function of unilateral lower posterior bounded saddle cases with metal insert partial dentures.

SPECIFIC OBJECTIVES

- To construct metal insert partial dentures for the selected unilateral lower posterior bounded saddle cases.
- To measure masticatory function of metal insert partial denture side and normal dentate side.
- To assess the patient satisfaction of selected cases.
- To compare the masticatory function of metal insert partial denture side and dentate side in selected cases.

LITERATURE REVIEW

For improved masticatory function, missing teeth are often replaced by fixed or removable prosthodontic appliances; indeed a clear relation exists between dental state and masticatory function, as determined with a chewing test.

Christiansen (1924) described the fractional sieving technique in which particle size is determined after comminuting of food. Fractional sieving is a technique for separating out portions of specified food after they have been chewed for a given time. It also measured the number of chewing strokes used the time required to chew a defined portion of test food.

Manly & Braley (1950) studied the masticatory performance based on the percentage of masticated peanuts by weighing the particles which would pass through a sieve after being subjected to 20 masticatory strokes.

Loos (1963) introduced a simplified method by spreading the chewed particles of hazelnuts on squares of paper and counting the particles of different sizes.

Luke & Lucas (1985) studied the influence of occlusal factor on the masticatory performance in 32 young dentate subjects; it was found that the rate of comminution was most highly correlated with the occlusal area of the post canine teeth.

Sato et al (2003) developed a single and easy method called the mixing ability test for evaluation of masticatory function. Two-colored paraffin wax cubes were used as the artificial test material.

Material and methods

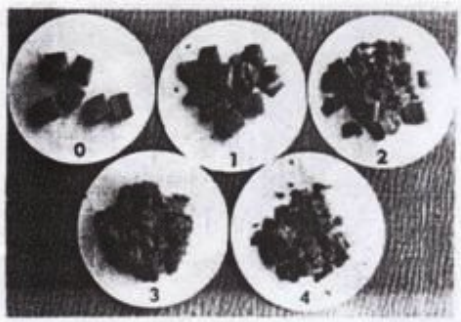
Twelve subjects of lower posterior unilateral bounded saddle cases were selected at the Prosthodontics Department, University of Dental Medicine (Ygn), according to selection criteria. The metal insert partial dentures were constructed and delivered to the subjects.

One week after intervention, masticatory function of subjects was measured by modified method of Julius Michman and Anselm Langer (1975).

Fresh raw carrots, cut in cubes of 6 sq.mm., were used as the test food because they did not disintegrate completely during mastication and particle size could be easily measured.

The fineness of particles was visually estimated by two examiners and scored, according to size, from 0 to 4.

Photo showing food comminution score evaluation



From Julius Michman and Anselm Langer, "Postinsertion changes in complete dentures"

J.Prosthet.Dent. (125-134) August, 1975

Score of 0 was given when no perceptible signs of chewing could be observed; 4 was given for the finest degree of comminution; and 1, 2 and 3 were used for the intermediate degrees.

The test was measured at dentate side first and then continued for metal insert partial denture side. The scores of each side were recorded for comparison.

Finally, subject satisfaction was assessed using a questionnaire modified from Julius Michman and Anselm Langer (1975).

Figure (I) Photo showing NPG alloy

Figure (II) Photo showing NPG alloy

Figure (III)
Photo showing impression for cast model

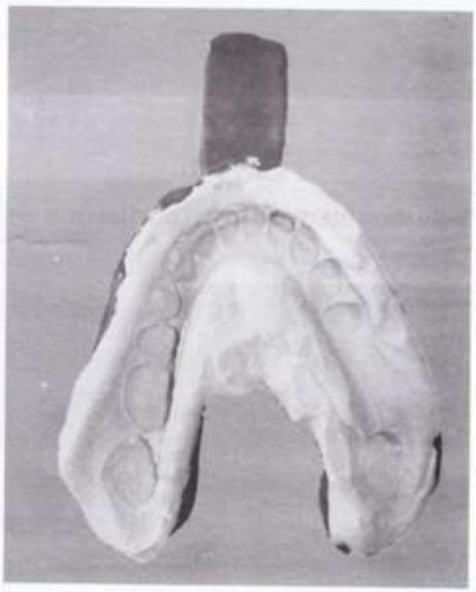


Figure (IV)
Photo showing cast model with metal insert

Figure (V)
Photo showing metal insert partial denture

Figure (VI)
Photo showing metal insert partial denture

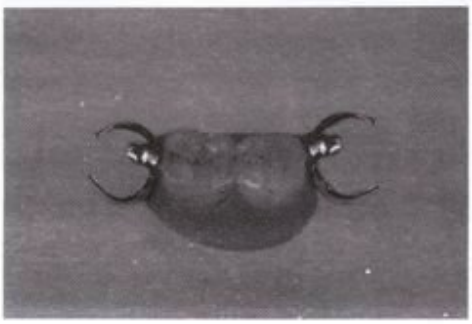


Figure (VII)
Photo showing test food (carrot)

Figure (VIII)
Photo showing food comminution score recording sheet
(metal insert partial denture side)

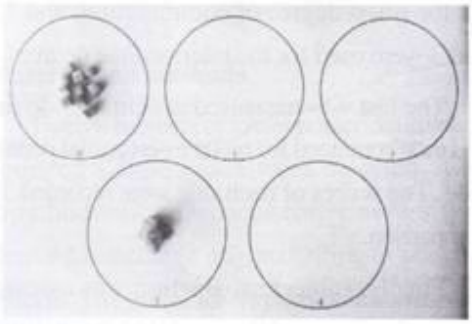


Figure (IX)
Photo showing food comminution score recording sheet (dentate side)

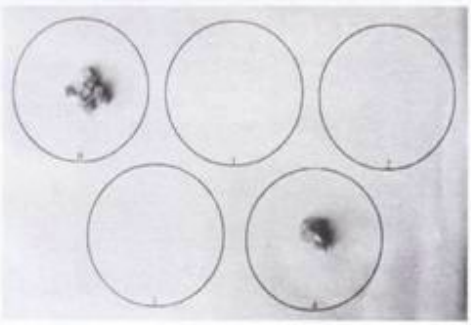


Diagram (1)

Showing comparison of food comminution score of normal dentate side and metal insert RPD side

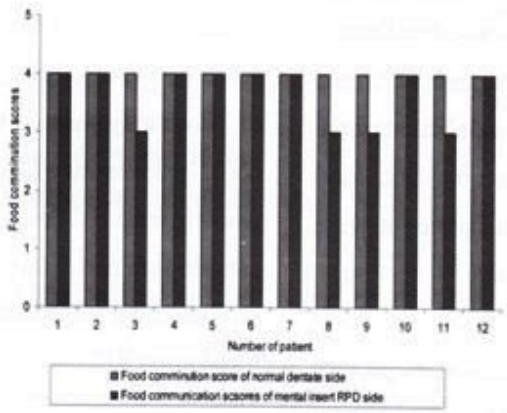
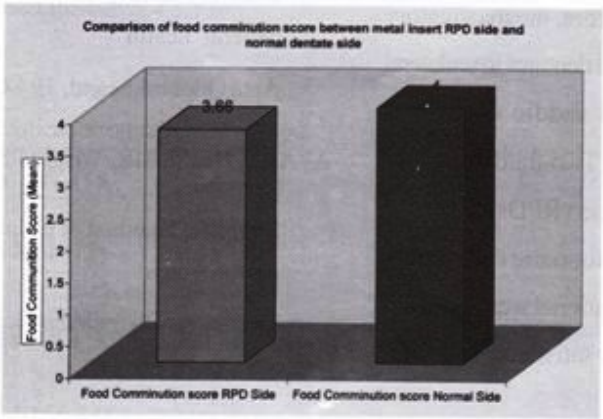


Diagram (2)

Showing comparison of food comminution score of normal dentate side and metal insert RPD side



Discussion

The food comminution score of natural dentate side and metal insert partial denture side was compared with Willcoxon Signed Ranks Test. (P value < 0.05). The difference in masticatory function of metal insert partial denture side and normal dentate side was statistically significant.

Our study involved 12 patients.Of these, eight patients could utilize the metal insert partial denture like normal dentate side. But, food comminution scores of four patients were different from normal dentate side.

In a long term study, however, food comminution scores could increase as the patients may tolerate and utilize more efficiently the metal insert partial dentures in mastication, over time.

In one-third of patients, food comminution scores were different between normal dentate side and metal insert RPD side. Two-third of patients were not different in food comminution scores between their normal dentate side and metal insert RPD side.

Two-third of patients were not different from normal dentate side. Therefore, the masticatory function of metal insert partial dentures in unilateral lower posterior bounded saddle cases was satisfactory to these patients. Two-third of patients were satisfied with metal insert RPDs.

According to the questionnaire concerning patient satisfaction, eight patients were satisfied and four patients were fairly satisfied.

Conclusion

Cost and special skill for cobalt-chromium framework are also important factors for both patient and dentist. Moreover, dental technicians need special skills to construct cobalt chromium frameworks. NPG metal inserts are not only cheaper and easier to use but also leading to achieve RPD objectives.

The study showed that NPG metal inserts could be a substitute for cobalt chromium frameworks in unilateral bounded saddle cases. A larger sample size and a longer study period would provide better information about the success of metal insert RPD.

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Prevalence of Traumatic Injuries to the Permanent Incisors among Middle School Children in Yangon Division

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Abstract

A total of 3217 school children (age 10 to 16 years) from 3 middle and 3 high schools of Tamwe and Hlegu Township in Yangon Division were examined and interviewed. Urban sample (Tamwe Township) was consisted of 1996 students and 1221 students were examined in rural area (Hlegu Township). The prevalence of traumatic injury was 14.5% (467 out of 3217). The prevalence was significantly higher in males than females with a ratio of almost 2:1. Among those with trauma, 81.4% of the subjects had only one tooth affected. Out of a total of 560 fractured teeth, 76.6% involved the maxillary central incisors. Very high level of untreated traumatized cases (99.5%) was noted. However, only 1.3% presented distinct problems like discoloration, sinus or abscess among those with untreated traumatized teeth. Interestingly, almost two third of the cases did not recognize their trauma as well as where, when and why it had been occurred. This study recommends further investigation of traumatic injuries among other specific age groups and other regions as well as educational programs to prevent dental trauma.

Introduction

The appearance of the face plays an important psychosocial role in human life and relationships. The features more commonly associated with facial attraction are the eyes and mouth (Cortes *et al.*, 2002). The patients, who are exposed to trauma, are both physically and psychologically affected (Gutmann *et al.*, 1995). Especially, fractured permanent tooth is a tragic experience for both child and parents who are more concerned with the aesthetic rather than the symptomatic aspect of the problem (Garcia, 1990).

Trauma to the permanent teeth is very common, but many of the injured teeth were untreated or received inadequate treatment (Hamilton *et al.*, 1997). There was no epidemiological research on the traumatic injuries to the permanent incisors in Myanmar.

Objectives

1. To study the prevalence of traumatic injuries to the permanent incisors
2. To investigate the possible determinants of dental trauma
3. To establish the educational program for prevention and management of traumatic injuries to the permanent incisors

Materials and methods

In the present sample, 6 Basic Education High Schools (3 schools each from Tamwe (Urban) and Hlegu (Rural) Townships) in Yangon Division were randomly selected. All eligible middle schoolchildren (age 10 to 16 years) from each school were asked for consent and examined. The subjects were examined by the examiner under natural light in a special room arranged by school. Two trained assistants recorded the results. Only maxillary and mandibular incisors were included in the exam. A tooth was scored as traumatic if it was observed that part of the tooth crown was cracked or broken, with no sign of dental caries. The collected variables were Children's age, location, gender, the occupation of father or guardian, categories of the causes of dental trauma (fall, collision, traffic accident, misuse of teeth, sports, violence and others), where and when trauma was occurred and the type of injury (WHO classification).

Result

Total sample consisted of 3217 middle schoolchildren (6^{th} to 9^{th} Grade) (1996 from Urban and 1221 from Rural). Among those 3217 students, dental traumatic injuries were seen in 467 children (14.5%)

The prevalence of traumatic dental injuries was significantly higher in males than females, (18.4% versus 10.4%) and the ratio of affected males to females was almost about 2:1 (Table 1).

Table 1. The prevalence of traumatic dental injuries by gender (N = 3217)

Gender	No. of examined children	No. of children with dental trauma (%)
Male	1660	305(18.4)
Female	1557	162 (10.4)
Total	3217	467 (14.5)

($p < 0.001$, Chi-square test, df = 1)

There was significantly higher level of traumatic injuries was found among those children from urban as compared to those of rural areas (16.5% versus 11.2% respectively) (Table 2)

Table 2. The prevalence of traumatic dental injuries by location (N = 3217)

Location	No. of examined children	No. of children with dental trauma (%)
Urban	1996	330 (16.5)
Rural	1221	137(11.2)
Total	3217	467(14.5)

($p < 0.001$, Chi-square test, df = 1)

Among those with dental trauma (n = 467), 87 (18.6%) had more than one permanent incisors affected (Table 4). Like prevalence data, more urban sample affected more than one tooth than rural children.

Table 3. Number of traumatic teeth according to location among those with trauma (n = 467)

Location	No. of traumatic teeth		Total
	One tooth >	One tooth	
Urban	260 (78.8%)	70 (21.2%)	330
Rural	120 (87.6%)	17 (12.4%)	137
Total	380 (81.4%)	87 (18.6%)	467

Among those with trauma (n = 467), only 3 children (0.6%) took treatment.

However, among untreated children, only 7 (1.4%) showed severe clinical problems like discoloration of tooth, sinus or abscess formation.

Possible etiology of dental injuries was interviewed for those with dental trauma. However, out of 467 children, 320 (68.5%) could not give any specific answer of causes.

For those who answered the specific causes, about of half of them gave misuse as a cause of trauma (Table 4).

Table 4. Etiology of injury among those with trauma (n = 467)

	Frequency	*%*
Not known	320	68.5
Falls	34	7.3
Accidents (bicycle)	5	1.1
Sporting activities	37	7.9
Fight	2	0.4
RTA	3	0.6
Misuse	66	14.1
Total	467	100

Similarly, most of the students with trauma (73%) did not know the place of injuries. For those who gave specific answer, half of them got trauma at home, the rest were happened at school or street.

DISCUSSION

Soft tissue injuries may heal without leaving any evidence and traumatic injuries such as luxation, concussion and intruded teeth that have successfully reerupted. Therefore, the data concerning dental trauma were not commonly recognized in public as well as in the field of dental science. The inclusion of enamel cracks (3.7%) in the present study might not affect the prevalence of dental injuries. However, the enamel fracture (85.4%) accounted major portion of this prevalence data. Most of the fractured anterior teeth involved the maxillary central incisors (76.6% of all permanent incisors).

In the present study, only one child had avulsed tooth and one child had intrusion other than fractured incisors. As observed in others studies, most of the children who experienced dental injuries had only one tooth damaged, and the most common form of damage identified was enamel or enamel / dentin fractures. Among all 467 students with dental trauma, only 3 children (0.5%) have taken treatment (2 root canal treatment and 1 immediate denture).

Without assessing the normative treatment need in the present study, there would have been an inaccurate estimation of treatment need based of the clinical assessment only. However, this study showed that not all untreated dental injuries needed treatment because some injuries were minor. On the other hand, not all treated injuries (only 3 students) were satisfactory and still have needed further treatment.

The last interesting finding in the present study was almost two third of the students (68.5%) who had dental trauma did not recognize why, where and when trauma has happened. This may be due to the lack of awareness, minor degree of the trauma, spontaneous healing of soft tissue lesions and certain extent un-affordability.

The present study showed that the commonest cause of trauma was misuse (biting the hard objects) and the place of injury has happened mostly in home. This finding differs from those studies carried out in the developed countries where the accidents in streets as the most common etiology.

This type of study should be carried out in other states and divisions as well as in other age groups. This study gave the limited information about the causes and found that dental trauma was not recognized among Myanmar peoples. Thus, further assessment of the etiology of dental trauma should be carried out to promote the preventive and educational program to increase the awareness of dental trauma among public. Moreover, traumatic dental injuries seem to be a serious dental public health problem among children in urban areas and this needs the further attention of oral health professionals.

Conclusion

1. The prevalence of traumatic dental injuries in Yangon Division was 14.5%.
2. Boys had more dental injuries than girls.
3. The prevalence was higher in urban area (Tamwe) than the rural area (Hlegu).
4. The prevalence was likely to increase with age.
5. Maxillary central incisors were the most affected teeth.
6. More than two-third of the students with trauma did not know the causes of dental injuries and known causes were mainly due to misuse.
7. The treatment of dental injuries was almost neglected.

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